**Supermicro**  
SuperServer 5019C-L (X11SCL-IF, Intel Xeon E-2104G)

<table>
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<td>Hardware Availability: Mar-2018</td>
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<tr>
<td>Tested by: Supermicro</td>
<td>Software Availability: Mar-2018</td>
</tr>
</tbody>
</table>

**Results**

- **SPECspeed2017_fp_base = 21.4**
- **SPECspeed2017_fp_peak = 21.7**

**Hardware**

- **CPU Name:** Intel Xeon E-2104G  
  Max MHZ.: 3200  
  Nominal: 3200  
  Enabled: 4 cores, 1 chip  
  Orderable: 1 chip  
  Cache L1: 32 KB I + 32 KB D on chip per core  
  L2: 256 KB I+D on chip per core  
  L3: 8 MB I+D on chip per chip  
  Other: None  
  Memory: 32 GB (2 x 16 GB 2Rx8 PC4-2666V-E)  
  Storage: 1 x 512 GB NVMe SSD  
  Other: None

**Software**

- **OS:** SUSE Linux Enterprise Server 12 SP3 (x86_64)  
  Kernel 4.4.114-94.11-default  
  Compiler: C/C++: Version 18.0.2.199 of Intel C/C++  
  Compiler for Linux: Fortran: Version 18.0.2.199 of Intel Fortran  
  Compiler for Linux:  
  Parallel: Yes  
  Firmware: Supermicro BIOS version 1.0 released Sep-2018  
  File System: xfs  
  System State: Run level 3 (multi-user)  
  Base Pointers: 64-bit  
  Peak Pointers: 64-bit  
  Other: jemalloc memory allocator library V5.0.1
Supermicro
SuperServer 5019C-L (X11SCL-IF , Intel Xeon E-2104G)

SPECspeed2017_fp_base = 21.4
SPECspeed2017_fp_peak = 21.7

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>4</td>
<td>714</td>
<td>82.6</td>
<td>717</td>
<td>82.2</td>
<td>719</td>
<td>82.0</td>
<td>4</td>
<td>714</td>
<td>82.6</td>
<td>717</td>
<td>82.2</td>
<td>719</td>
<td>82.0</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>4</td>
<td>496</td>
<td>33.6</td>
<td>492</td>
<td>33.9</td>
<td>491</td>
<td>34.0</td>
<td>4</td>
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<td>619.lbm_s</td>
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<td>6.88</td>
<td>760</td>
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<td>761</td>
<td>6.88</td>
<td>4</td>
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<td>6.89</td>
<td>761</td>
<td>6.88</td>
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<tr>
<td>621.wrf_s</td>
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<td>505</td>
<td>26.2</td>
<td>505</td>
<td>26.2</td>
<td>499</td>
<td>26.5</td>
<td>4</td>
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<td>466</td>
<td>28.4</td>
<td>466</td>
<td>28.4</td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>4</td>
<td>477</td>
<td>24.9</td>
<td>476</td>
<td>24.9</td>
<td>477</td>
<td>24.9</td>
<td>4</td>
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<td>638.imagick_s</td>
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<td>14.7</td>
<td>981</td>
<td>14.7</td>
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<tr>
<td>644.nab_s</td>
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<td>607</td>
<td>28.8</td>
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<td>607</td>
<td>28.8</td>
<td>4</td>
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<td>607</td>
<td>28.8</td>
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<tr>
<td>649.fotonik3d_s</td>
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<td>527</td>
<td>17.3</td>
<td>527</td>
<td>17.3</td>
<td>528</td>
<td>17.3</td>
<td>4</td>
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<td>528</td>
<td>17.3</td>
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<tr>
<td>654.roms_s</td>
<td>4</td>
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<td>14.7</td>
<td>1069</td>
<td>14.7</td>
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<td>4</td>
<td>1067</td>
<td>14.7</td>
<td>1068</td>
<td>14.7</td>
<td>1067</td>
<td>14.8</td>
</tr>
</tbody>
</table>

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

Operating System Notes
Stack size set to unlimited using "ulimit -s unlimited"

General Notes

Environment variables set by runcpu before the start of the run:
KMP_AFFINITY = "granularity=fine,compact"
LD_LIBRARY_PATH = "/home/cpu2017/lib/ia32:/home/cpu2017/lib/intel64:/home/cpu2017/je5.0.1-32:/home/cpu2017/je5.0.1-64"
OMP_STACKSIZE = "192M"

Binaries compiled on a system with 1x Intel Core i7-6700K CPU + 32GB RAM memory using Redhat Enterprise Linux 7.5
Transparent Huge Pages enabled by default
Prior to runcpu invocation
Filesystem page cache synced and cleared with:
sync; echo 3> /proc/sys/vm/drop_caches

Yes: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown) is mitigated in the system as tested and documented.
Yes: The test sponsor attests, as of date of publication, that CVE-2017-5753 (Spectre variant 1) is mitigated in the system as tested and documented.
Yes: The test sponsor attests, as of date of publication, that CVE-2017-5715 (Spectre variant 2) is mitigated in the system as tested and documented.
Supermicro
SuperServer 5019C-L (X11SCL-IF, Intel Xeon E-2104G)

SPECspeed2017_fp_base = 21.4
SPECspeed2017_fp_peak = 21.7

CPU2017 License: 001176
Test Sponsor: Supermicro
Tested by: Supermicro

Test Date: Nov-2018
Hardware Availability: Nov-2018
Software Availability: Mar-2018

Platform Notes
Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on linux-01g1 Fri Nov 9 23:16:47 2018

SUT (System Under Test) info as seen by some common utilities.
For more information on this section, see
https://www.spec.org/cpu2017/Docs/config.html#sysinfo

From /proc/cpuinfo
model name: Intel(R) Xeon(R) E-2104G CPU @ 3.20GHz
  1 "physical id"s (chips)
  4 "processors"
cores, siblings (Caution: counting these is hw and system dependent. The following
excerpts from /proc/cpuinfo might not be reliable. Use with caution.)
cpu cores: 4
siblings: 4
physical 0: cores 0 1 2 3

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 4
On-line CPU(s) list: 0-3
Thread(s) per core: 1
Core(s) per socket: 4
Socket(s): 1
NUMA node(s): 1
Vendor ID: GenuineIntel
CPU family: 6
Model: 158
Model name: Intel(R) Xeon(R) E-2104G CPU @ 3.20GHz
Stepping: 10
CPU MHz: 3129.410
CPU max MHz: 3200.0000
CPU min MHz: 800.0000
BogoMIPS: 6383.97
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 256K
L3 cache: 8192K
NUMA node0 CPU(s): 0-3
Flags: fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp
lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc
aperfmperf eagerfpu pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg

(Continued on next page)
### Platform Notes (Continued)

- fma cx16 xtpr pdcm pcid sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes
- xsave avx f16c rdrand lahf_lm abm 3dnowprefetch arat epb invpcid_single pln pts
dtherm hwp hwp_notify hwp_act_window hwp_epp intel_pt rsb_ctxsw spec_ctrl retpoline
kaiser tpr_shadow vmmi fexprid s dbp id vpid fsgsbase tsc_adjust bmi1 hle avx2 smep
bmi2 erms invpcid rt mmp rdseed adx smap clflushopt xsaveopt xsavc xgetbv1

```
/proc/cpuinfo cache data
cache size: 8192 KB
```

From `numactl --hardware`

```
WARNING: a numactl 'node' might or might not correspond to a physical chip.
```

```
available: 1 nodes (0)
node 0 cpus: 0 1 2 3
node 0 size: 32089 MB
node 0 free: 18026 MB
node distances:
node 0
  0: 10
```

From `/proc/meminfo`

```
MemTotal: 32860044 kB
HugePages_Total: 0
Hugepagesize: 2048 kB
```

From `/etc/*release` /`etc/*version`

```
SuSE-release:
SUSE Linux Enterprise Server 12 (x86_64)
VERSION = 12
PATCHLEVEL = 3
# This file is deprecated and will be removed in a future service pack or release.
# Please check /etc/os-release for details about this release.
os-release:
NAME="SLES"
VERSION="12-SP3"
VERSION_ID="12.3"
PRETTY_NAME="SUSE Linux Enterprise Server 12 SP3"
ID="sles"
ANSI_COLOR="0;32"
CPE_NAME=cpe:/o:suse:sles:12:sp3
```

```
uname -a:
Linux linux-01g1 4.4.114-94.11-default #1 SMP Thu Feb 1 19:28:26 UTC 2018 (4309ff9)
x86_64 x86_64 x86_64 GNU/Linux
```

Kernel self-reported vulnerability status:

- **CVE-2017-5754 (Meltdown):** Mitigation: PTI

(Continued on next page)
### Platform Notes (Continued)

CVE-2017-5753 (Spectre variant 1): Mitigation: Barriers  
CVE-2017-5715 (Spectre variant 2): Mitigation: IBRS+IBPB  

run-level 3 Nov 9 03:43  

SPEC is set to: /home/cpu2017  
Filesystem Type Size Used Avail Use% Mounted on  
/dev/nvme0n1p4 xfs 435G 35G 400G 9% /home  

Additional information from dmidecode follows. WARNING: Use caution when you interpret this section. The 'dmidecode' program reads system data which is "intended to allow hardware to be accurately determined", but the intent may not be met, as there are frequent changes to hardware, firmware, and the "DMTF SMBIOS" standard.  
BIOS American Megatrends Inc. 1.0 09/14/2018  
Memory:  
2x Micron 18ADF2G72AZ-2G6H1R 16 GB 2 rank 2667  

(End of data from sysinfo program)

### Compiler Version Notes

```
==============================================================================
CC  619.lbm_s(base) 638.imagick_s(base, peak) 644.nab_s(base, peak)
------------------------------------------------------------------------------
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

------------------------------------------------------------------------------
CC   619.lbm_s(peak)
------------------------------------------------------------------------------
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------
```

(Continued on next page)
**SPEC CPU2017 Floating Point Speed Result**

**Supermicro**  
SuperServer 5019C-L (X11SCL-IF, Intel Xeon E-2104G)

<table>
<thead>
<tr>
<th>SPECspeed2017_fp_base</th>
<th>SPECspeed2017_fp_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>21.4</td>
<td>21.7</td>
</tr>
</tbody>
</table>

**CPU2017 License**: 001176  
**Test Sponsor**: Supermicro  
**Tested by**: Supermicro

**Test Date**: Nov-2018  
**Hardware Availability**: Nov-2018  
**Software Availability**: Mar-2018

---

**Compiler Version Notes (Continued)**

```
FC 603.bwaves_s(base) 649.fotonik3d_s(base) 654.roms_s(base, peak)
ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
```

```
FC 603.bwaves_s(peak) 649.fotonik3d_s(peak)
ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
```

```
CC 621.wrf_s(base) 627.cam4_s(base, peak) 628.pop2_s(base)
ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
```

```
CC 621.wrf_s(peak) 628.pop2_s(peak)
ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
```

---

**Base Compiler Invocation**

**C benchmarks:**  
`icc -m64 -std=c11`

**Fortran benchmarks:**  
`ifort -m64`

**Benchmarks using both Fortran and C:**  
`ifort -m64 icc -m64 -std=c11`

**Benchmarks using Fortran, C, and C++:**  
`icpc -m64 icc -m64 -std=c11 ifort -m64`
SPEC CPU2017 Floating Point Speed Result

Supermicro SuperServer 5019C-L (X11SCL-IF, Intel Xeon E-2104G)

**SPECspeed2017_fp_base** = 21.4
**SPECspeed2017_fp_peak** = 21.7

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### Base Portability Flags

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Flags</th>
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<tr>
<td>603.bwaves_s</td>
<td>-DSPEC_LP64</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>-DSPEC_LP64</td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>-DSPEC_LP64</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>-DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian</td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>-DSPEC_LP64 -DSPEC_CASE_FLAG</td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>-DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>-DSPEC_LP64</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>-DSPEC_LP64</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>-DSPEC_LP64</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>-DSPEC_LP64</td>
</tr>
</tbody>
</table>

### Base Optimization Flags

**C benchmarks:**

```bash
-Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div -gopt-prefetch
-ffinite-math-only -gopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP
-L/usr/local/je5.0.1-64/lib -ljemalloc
```

**Fortran benchmarks:**

```bash
-Wl,-z,muldefs -DSPEC_OPENMP -xCORE-AVX2 -ipo -O3 -no-prec-div
-gopt-prefetch -ffinite-math-only -gopt-mem-layout-trans=3 -qopenmp
-nostandard-realloc-lhs -L/usr/local/je5.0.1-64/lib -ljemalloc
```

**Benchmarks using both Fortran and C:**

```bash
-Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div -gopt-prefetch
-ffinite-math-only -gopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP
-nostandard-realloc-lhs -L/usr/local/je5.0.1-64/lib -ljemalloc
```

**Benchmarks using Fortran, C, and C++:**

```bash
-Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div -gopt-prefetch
-ffinite-math-only -gopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP
-nostandard-realloc-lhs -L/usr/local/je5.0.1-64/lib -ljemalloc
```

### Peak Compiler Invocation

**C benchmarks:**

```bash
icc -m64 -std=c11
```

**Fortran benchmarks:**

```bash
ifort -m64
```
Supermicro
SuperServer 5019C-L (X11SCL-IF, Intel Xeon E-2104G)

SPECspeed2017_fp_base = 21.4
SPECspeed2017_fp_peak = 21.7

CPU2017 License: 001176
Test Sponsor: Supermicro
Tested by: Supermicro

Test Date: Nov-2018
Hardware Availability: Nov-2018
Software Availability: Mar-2018

Peak Compiler Invocation (Continued)
Benchmarks using both Fortran and C:
ifort -m64 icc -m64 -std=c11

Benchmarks using Fortran, C, and C++:
icpc -m64 icc -m64 -std=c11 ifort -m64

Peak Portability Flags
Same as Base Portability Flags

Peak Optimization Flags
C benchmarks:
619.lbm_s: basepeak = yes

638.imagick_s: -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp
-DSPEC_OPENMP

644.nab_s: basepeak = yes

Fortran benchmarks:
603.bwaves_s: basepeak = yes

649.fotonik3d_s: -prof-gen(pass 1) -prof-use(pass 2) -DSPEC_SUPPRESS_OPENMP
-DSPEC_OPENMP -O2 -xCORE-AVX2 -qopt-prefetch -ipo -O3
-ffinite-math-only -no-prec-div -qopt-mem-layout-trans=3
-qopenmp -nostandard-realloc-lhs

654.roms_s: -DSPEC_OPENMP -xCORE-AVX2 -ipo -O3 -no-prec-div
-qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=3
-qopenmp -nostandard-realloc-lhs

Benchmarks using both Fortran and C:
621.wrf_s: -prof-gen(pass 1) -prof-use(pass 2) -O2 -xCORE-AVX2
-qopt-prefetch -ipo -O3 -ffinite-math-only -no-prec-div
-qopt-mem-layout-trans=3 -DSPEC_SUPPRESS_OPENMP -qopenmp
-DSPEC_OPENMP -nostandard-realloc-lhs

(Continued on next page)
Supermicro
SuperServer 5019C-L (X11SCL-IF , Intel Xeon E-2104G)

SPECspeed2017_fp_base = 21.4
SPECspeed2017_fp_peak = 21.7

CPU2017 License: 001176
Test Sponsor: Supermicro
Tested by: Supermicro

Test Date: Nov-2018
Hardware Availability: Nov-2018
Software Availability: Mar-2018

Peak Optimization Flags (Continued)

627.cam4_s: -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp
-DSPEC_OPENMP -nostandard-realloc-lhs

628.pop2_s: Same as 621.wrf_s

Benchmarks using Fortran, C, and C++:

607.cactuBSSN_s: basepeak = yes

The flags files that were used to format this result can be browsed at

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.2017-12-21.xml
http://www.spec.org/cpu2017/flags/Supermicro-Platform-Settings-V1.2-SKL-revD.xml

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For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.

Tested with SPEC CPU2017 v1.0.5 on 2018-11-09 10:16:46-0500.
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